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ABSTRACT

The influence of angle, approach, and sex of subject on the personal space distance needs of the elderly person was examined. Subjects were 20 females and 20 males, age 65 or older, living in the same retirement housing unit. The behavioral measurement technique showed acceptable test-retest reliability. A significant three-way interaction effect was identified. The main effects of angle and approach were significant; a main effect by sex of the subject was not supported. Elderly subjects allowed a stimulus-individual (identified as a nurse) to approach closer than they approached the same stimulus-individual, suggesting that personal space is a factor to be considered by those giving care to or working with the elderly. Personal space is a complex phenomenon needing further study, especially in relation to the elderly. (Author)

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PERSONAL SPACE BOUNDARY OF ELDERLY PERSONS LIVING IN RETIREMENT HOUSING

Paper presented at the 32nd Annual Scientific Meeting of the Gerontological Society, Washington, D.C.

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There is an abundance of literature reporting the findings of studies on personal space. Nearly all of the studies reported in the literature have used children and young adults as the subjects, neglecting those over age 65. Up to this time nursing has been provided with very little information concerning the personal space boundaries of elderly persons.

Burnside (1973) contends that inaccurate determination of a patient/client's personal space boundary (moving in too close or not close enough) results in failure of the nursing process with that client. For example, in interviewing, the failure to determine accurately the client's personal space boundary results in a lack of needed information which may make a situation critical because of a lack of pertinent information. Roberts (1973) points out that most nursing procedures represent a direct intrusion into the personal space of the patient. Intrusion into the aged patient's personal space may result in angry behavior, refusal of procedures, or silence. Such intrusion may also weaken the client's defenses. All of these responses are detrimental to the patient/client.

Therefore, this study was designed to assess the personal space boundary of elderly persons, to identify the base line as it is influenced by (a) the angle from which a stimulus-individual approaches an elderly person and (b) the angle from which an elderly person approached a stimulus-individual. This was accomplished by comparing the differences in the distance of the personal space

boundary at multiple predetermined angles/points when an elderly subject was approached by a stimulus-individual or the subject approached the same stimulus-individual from these predetermined angles/points.

Hypotheses

Four null hypotheses were developed for testing in this study. These hypotheses were:

Hypothesis 1. The mean personal space distance measures will be the same for the male and female individuals in the elderly population being studied.

Hypothesis 2. The mean personal space distance measures of individuals in the elderly population being sampled will be the same when the subjects (moving) are approaching the stimulus-individual and when the subjects (stationary) are being approached by the same stimulus-individual.

Hypothesis 3. The mean personal space distance measures of individuals in the elderly population being studied will be the same for five different angles of approach in the frontal plane of the person being approached.

Hypothesis 4. There will be no interaction effects on the personal space distance measures from the three independent variables: sex of subject, type of approach, and angle of approach.

Definitions

For the purposes of this study, the major terms were defined and used as follows:

Approach--Movement by the subject toward the stimulus-individual.

Be Approached--Movement by the stimulus-individual toward the subject.

Diagonal Angle--A position 45 degrees to the right or the left of the person who is stationary (Positions 2, 4, 7, and 9 as shown in Figure 1).

Elderly Person--An individual who has achieved at least the age of 65 years.

Frontal Angle--A position 90 degrees to the frontal plane of the person who is stationary (a face-to-face position). See positions 3 and 8 in Figure 1.

Lateral Angle--A position zero degrees to the right and the left of the person who is stationary (Positions 1, 5, 6, and 10 as shown in Figure 1).

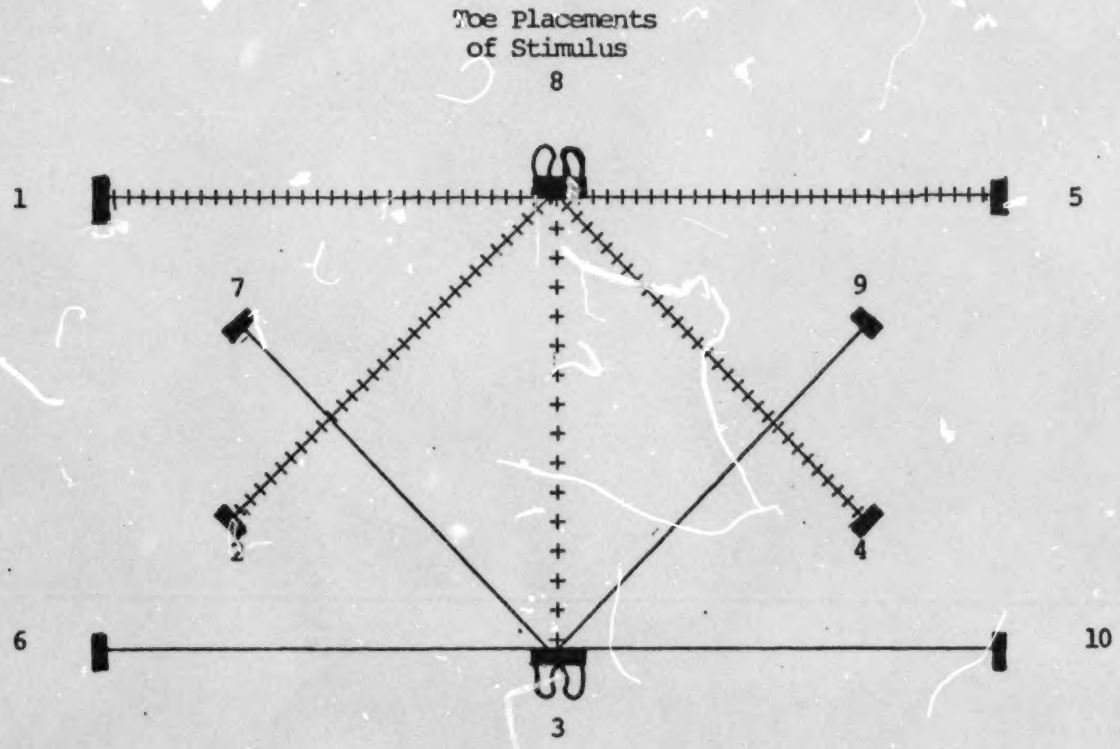
Personal Space--An area external to an individual that is characterized by boundaries that are not clearly demarcated; this area is not necessarily spherical in shape. It extends in all dimensions around the individual; it expands and contracts under the influence of a wide range of variables but remains relatively constant for a given person. It is a concentric area of invisible space carried with the individual as he moves around. The intrusion of this space may be met with a variety of behaviors (physiological, psychological, and/or physical).

Personal Space Boundary--The outer limits of the invisible area which an individual designates as his/her personal space (Boucher, 197[illegible]). It is measured as the point at which the subject feels that the invader (stimulus-individual) has come "too close" (Hildreth, Derogatis & McCusker, 1971; Kinzel, 1970), or to the point at which the subject feels the desire to withdraw from the invader (stimulus-individual).

FIGURE 1

DIAGRAM OF THE LINES (PATHS) FOR THE

APPROACH AND THE BE APPROACHED SITUATIONS



▬ = Actual tape markings.

_____ = Lines (paths) of Be Approached.

+++++++ = Lines (paths) of Approach.

+ + + + = Line of both Approach and Be Approached

900 Cm.

Stimulus-individual--An assistant of the investigator (a stranger to the subject prior to the testing) who both approached and was approached by the subject in order to determine the subject's personal space boundary.

Verbal Report--Statement of "stop" by the subject when he/she began to feel uncomfortable or uneasy, to feel that the stimulus-individual had come close enough, or to feel a desire to withdraw from the stimulus-individual.

Setting and Sample Selection

The study was conducted at one low income, federally subsidized apartment housing unit for the elderly in a southern city. The total population of the unit was approximately 200 (150 females and 50 males).

The sample of 40 persons (20 females and 20 males, ranging in age from 65 to 90) was selected using convenience and quota methods. Each individual was selected on the basis of his/her willingness to participate in the study and his/her ability to meet the preset criteria for participation. The preset criteria included independence in the subjects's daily living activities and no limitations in mobility and mental ability due to a physical and/or mental disability. This level was set to meet one of the purposes of the study, to identify a base line for personal space distance of independently functioning elderly persons. In addition, these criteria produced subjects who were a homogeneous as possible and provided for elimination of the effects of intervening variables on the dependent variables.

Design

Three experimental variables (factors) were arranged in a 2 x 2 x 5 factorial design. The variables were sex of subject, type of approach, and angle of approach, with repeated measures on the last two variables. The first factor, sex, involved two groups of subjects: 20 females and 20 males. The second factor, type of approach, also, had two levels: (a) the subject (moving) approaching the stimulus-individual, and (b) the subject (stationary) being approached by the stimulus-individual. The third factor, angle of approach, had five levels as presented in Figure 1.

Instruments

Behavioral Measure of Personal Space. The behavioral type of measurement seemed to be the simplest and most direct way to measure personal space. Adequate reliability had been demonstrated in other studies and it also provided strong support for at least face validity in the measurement of an individual's boundary of personal space. The measurement technique had the subject approach or be approached by the stimulus-individual with the subject reporting verbally the location of his/her personal space boundary at each of five predetermined points (angles) in the two situations.

Because the reliability of this type of measurement technique had not previously been documented utilizing an elderly population and because I was using a slightly different procedure an estimate of the reliability of the measurement was obtained. The reliability of the measurement technique was estimated by a test-retest procedure. The retest was made within thirty minutes following the first testing.

The test-retest reliability coefficients ranged from .76 to .91.

Before the measurements were taken each subject was thoroughly briefed on the concept of personal space and how it was to be measured in the testing situation. It is, consequently, assumed that the measurements obtained are reflections of each subject's personal space.

Mental Status Questionnaire (MSQ). The MSQ was administered during the intake interview as part of the screening process. The MSQ was used to determine that the subjects were relatively free of Chronic Brain Syndrome (CBS). Full participation of each subject was needed for the measurements of personal space to be valid. The data obtained were considered to be free from contamination due to a lack of understanding by the subject.

Pilot Study

A pilot study was conducted with four elderly males and five elderly females to refine the procedures used in collection of the data. The findings from the pilot study that prompted modification in the study originally planned are as follows: 1. The time needed per subject to complete the actual measurements indicated the elderly subjects would not be unduly fatigued by a test-retest procedure. 2. A need to practice the measurement procedure with each subject before the actual testing began. 3. Deletion of the last item on the MSQ.

Findings

The t-test for paired observations was used to determine if a difference existed between the test and retest mean scores. As the results were not statistically significant the mean scores

for each measure for each subject were summed in the remainder of the analyses. Use of the [illegible] from the two testing offered more reliable data for each subject than data from just one testing.

As noted above, the differences between the test and retest mean distances were not statistically significant, however, the scores revealed a surprising pattern of consistency (see Table 1). In the approach situation the test minus retest mean differences were all positive. This indicated the mean scores for the initial test were larger than the mean scores for the retest--i.e, the subjects consistently approached closer to the stimulus-individual on the retest. However, in the Be Approached situation all of the mean differences were negative, indicating the subjects did not allow the stimulus-individual to approach as close in the retest situation as in the first test. Perhaps the subjects felt freer in stopping the stimulus-individual at a more distant point in the second testing. This also suggests that the individual's true personal space boundary may lie somewhere between the Approach and the Be Approached distances as the second Approach-mean scores came closer to the second Be Approached mean scores but they were not smaller in total distance.

Subjects

Age. Since there was a 25 year age span, the mean ages of the men and women participants were compared to determine if a statistically significant difference existed between these two samples. The mean and median scores showed the females to be

TABLE 1

TEST AND RETEST SCORES FOR PERSONAL SPACE DISTANCE SCORES AS MEASURED IN CENTIMETERS WITH THE BEHAVIORAL INSTRUMENT FOR ALL SUBJECTS

(N=40)

Variable	Test		Retest		Mean (Test - Retest)	Reliability*	t Value	t Probability
	$\bar{X}$	S.D.	$\bar{X}$	S.D.				
Approach (Subject Moving)	519.19	221.58	505.49	224.57	13.69	.897	.86	.399
Angle 1	544.90	226.79	536.32	220.72	8.57	.914	.58	.563
Angle 2	520.05	238.25	494.77	214.21	25.27	.764	1.02	.315
Angle 3	468.32	240.56	452.87	241.97	15.45	.796	.63	.529
Angle 4	500.92	231.84	498.35	244.16	2.57	.837	.12	.905
Angle 5	561.75	228.18	545.15	240.33	16.60	.864	.86	.396
Be Approached (Subject Stationary)	464.63	217.06	485.98	222.06	-21.34	.912	-1.47	.150
Angle 1	499.05	234.45	516.80	238.99	-17.75	.831	-.82	.419
Angle 2	463.92	238.40	472.80	219.34	-8.87	.843	-.43	.667
Angle 3	431.25	256.92	436.00	238.89	-4.75	.775	-.18	.858
Angle 4	451.00	218.97	482.85	235.37	-31.85	.788	-1.35	.183
Angle 5	477.95	207.84	521.45	229.00	-43.50	.907	-2.86	.007

*Reliability = test-retest reliability coefficient.

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younger ($\bar{X}$ 75.05 years) than the males ($\bar{X}$ 76.5 years). However, the independent sample t-test did not show a significant difference between the mean ages of the two groups. In addition the ranges of the two groups were similar.

The factors of hearing, vision, ambulation status, handedness, medications, and disease/disability were distributed nearly equally between the males and the females.

Hypothesis Testing

To test the Hypotheses 1 through 4 the data were analyzed using VSTAT"s AOV123, Model 3, design BWW (Veldman, 1972). The results included F ratios for the main effects and for each of the possible interaction effects.

Hypothesis 1. Results did not show the mean personal space boundary distances for the female subjects to be significantly different from those of the male subjects. Therefore, Hypothesis 1 was not rejected. While statistical significance was not achieved, it should be noted that with only one exception the mean distances for the males were smaller for each measure than the mean distances for the females.

Hypothesis 2. The mean personal space distance measures of the subjects approaching (moving) did differ significantly from the mean measures obtained when the subjects were approached (stationary) $F(1,38) = 4.7756$, $p = .033$. As a result, Hypothesis 2 was rejected.

The overall mean measure for the subjects being approached was smaller than the mean measure obtained when the subjects were approaching. This finding suggests that the elderly subjects in general allowed a stimulus-individual to approach significantly

closer than they approached the same stimulus-individual. The mean distance for the female subjects decreased appreciably when they were approaching the simulus-individual, while the mean distance for the male subjects decreased only slightly in the same situation. However, these differences were not great enough for a sample of this size to produce a statistically significant interaction effect.

Hypothesis 3 The differences in the mean distances measured from the five angles were found to be statistically significant -- F (4,152) = 23.3210, p= .001 (see Table 2). Consequently Hypothesis 3 was rejected. The mean distance measures at the lateral angles (1 and 5) were the largest and were nearly equal to each other (Angle 1= 524.26; Angle 5 = 526.57). A similar relationship can be seen between the diagonal angles (2 and 4); this pair of mean distance measures (Angle 2 = 487.88; Angle 4 = 483.28) are smaller than the lateral angle means. The face-to-face angle (Angle 3) mean distance measure (Angle 3 = 447.11) is smaller than each of the other four angle means.

Hypothesis 4. The mean distance measures for the two-way interactions A x B, A x C, and B x C were not statistically significantly different. The three-way interaction effect was found to be statistically significant--F(4,152) = 3.3673, p = .001 (see Table 2). This finding justified the rejection of Hypothesis 4.

Identification of the source of the significant difference in a three-way interaction effect is not usually simple and clear. Figure 2 is a graphic illustration of the A x B x C cell mean distance measures and are presented to offer a visual basis for determination of the nature of the significant interaction effect.

Figure 4 suggests a special influence by the Approach situation on the mean distance measure for females; these means are larger for the five angles in the Approach situation than the means for both the females in the Be Approached and the means for the males in both types of approach situations. The males and females allow themselves to Be Approached to very similar distances; however, the Approach situation data indicate that the males approached the simulus-individual far more closely from all five angles than did the females.

Another difference that can be identified is at the left lateral angle (Angle 1) in the Be Approached situation. The mean distance for females is smaller than the mean distance for males, which is in direct contrast to the male-female score relationship at all the other angles and types of approach.

The graph (Figure 4) indicated the existence of appreciable differences between the female Approach and Be Approached mean scores. Analyses of variance were computed by sex for the type of aporoach to determine if the differences were great enough to be of statistical significance; however, the F ratios were not found statistically significant for samples of this size.

Discussion and Summary

The findings in this study contradict results in studies with younger age females and males where it was found that both sexes approached a stimulus more closely than they allowed themselves to be approached. The findings in this study may have been influenced by the role identity (registered nurse) of the stimulus-individual; a stimulus-individual without a specific role identity might have evoked a response similar to those found in

TABLE 2

SOURCE TABLE OF ANOVA FOR

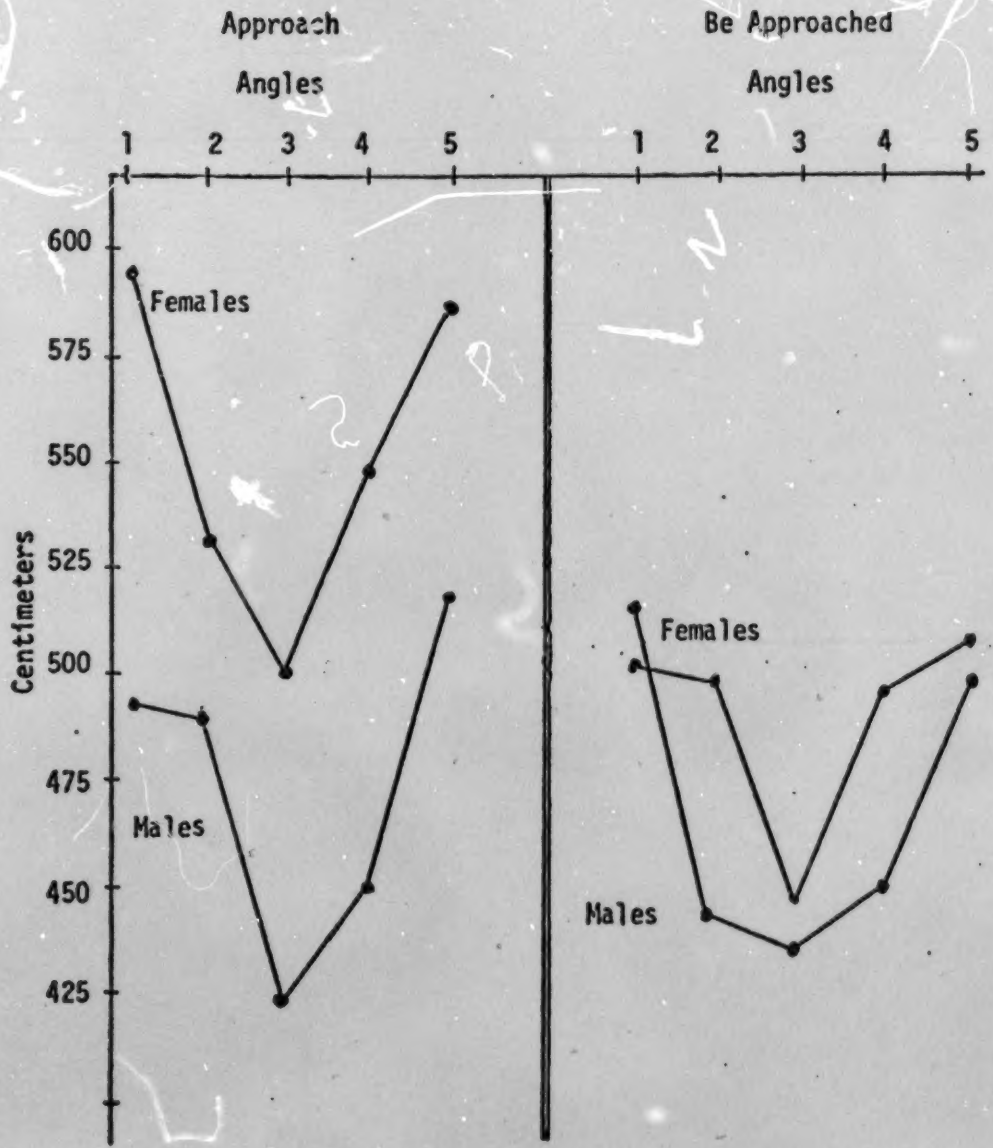
SEX (1,2), APPROACH (1,2), AND ANGLE (1,5)

Source	df	S.S.	M.S.	F	P
Between Subjects	39	17,032,464.54			
Sex (A)	1	234,885.62	234,885.62 (Ea)	.5314	.477
Error: Between Subjects (Ea)	38	16,797,578.92	442,041.55		
Within Subjects	360	2,742,471.30			
Approach (B)	1	137,159.12	137,159.12 (Eb)	4.7756	.033*
Angle (C)	4	346,229.33	86,557.33 (Ec)	23.3210	.001*
AB	1	70,384.09	70,384.09 (Eb)	2.4506	.122
AC	4	9,970.69	2,492.67 (Ec)	.6716	.615
BC	4	8,444.79	2,111.19 (Eab)	.6787	.610
ABC	4	41,901.81	10,475.45 (Eab)	3.3676	.011*
Error: Within Subjects	342				
Error: (Eb)	38	1,091,401.68	28,721.09		
Error: (Ec)	152	564,156.42	3,711.55		
Error: (Eab)	152	472,823.73	3,110.68		
Total	399	19,774,935.84			

*p < .05

FIGURE 2

GRAPHIC DEPICTION OF THREE-WAY INTERACTION CELL MEANS



previous study. Before making the assumption that elderly persons have a smaller personal space distance when they are approached, data are needed that would demonstrate similar space distances with other types of stimulus-individuals.

Another possible cause for the discrepancy in the findings between this study and most of the previous studies is that the elderly persons may not be reacting as quickly to halt the approach of the stimulus-individual. The reaction time of the subject may be a pertinent variable in further studies with elderly persons.

The statistically significant findings support the hypothesis that an elderly subject's personal space boundary is not the same distance in all dimensions of the frontal plane. More specifically the data suggest that personal space for the elderly persons is smaller in a face-to-face position than for the lateral positions. Differences in mean distances for these three lateral angles were found to be similar with both the male and female subjects.

Personal space distance data of independently functioning elderly subjects collected in this study can be used as a base line for identifying the influence exerted on behavior when personal space in invaded, decreased, or altered. Alteration of personal space may occur in hospitalization, admission to a nursing home, or in a health clinic visit. Investigation of the possible effects of personal space violations on the elderly client's recovery, adjuctment, or desired change in behavior for increased health is also possible.

The nurse needs to be acutely aware of the personal space requirement of the elderly person when one considers the number of times a nuse invades the client's personal space. More specifically the nurse needs to modify nursing practice with elderly clients by taking into account the type of approach being used as well as the angle of approach from which the individual's space is being invaded. The personal space needs can be expected to be greater to the sides of the client than to the front (face-to-face). It sould be anticipated that the elderly client has greater personal space needs when he/she approaches the nurse than when the nurse does the approaching. This decrease in personal space distance allowed by the elderly person when the nurse approaches may not be a true reflection of the individual's personal space needs, however; instead, it may be an adaptation the individual makes due to his/her expectations regarding the role of the nurse. If one considers the function of the nurse to be delivery of care, it seems more appropriate for the nurse to make modification, when possible, to maintain the client's needed personal space rather than to demand that the client ignore his/her own needs to meet the needs imposed by the nurse.

Further study is needed to identify the effect of invasion of personal space on attitudes and health related behaviors, such as compliance by elderly clients with treatments recommended by the nurse, as well as study of the influence of different role-specific stimulus-individuals on personal space boundary.

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The complete reference list used of this study can be obtained by writing the author.